DEPARTMENT OF HEALTH AND SOCIAL SECURITY

Social Security Act 1975

Asbestos-Related Diseases without Asbestosis

Report by the Industrial Injuries Advisory Council
in accordance with Section 141 of the Social Security Act 1975
on the question whether asbestos-related diseases without
asbestosis should be prescribed under the Act.

Presented to Parliament by the Secretary of State for Social Services
by Command of Her Majesty
November 1982

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*Composition of the Council on 8th October, 1982.

INDUSTRIAL INJURIES ADVISORY COUNCIL

Report on the question whether asbestos-related diseases without asbestosis should be prescribed under the Social Security Act 1975

The Right Honourable Norman Fowler, M.P.,
Secretary of State for Social Services.

Sir,

Under the arrangements whereby the Council periodically consider additions or amendments to the list of diseases prescribed under the industrial injuries provisions of the Social Security Act 1975, consideration has been given to asbestos-related diseases.

In 1980 evidence was brought to our attention suggesting that industrial injuries cover should be extended to two conditions which had been observed to occur in asbestos workers not suffering from asbestosis, namely lung cancer and diffuse pleural thickening. We referred this to Committee II of the Council, who carried out a full investigation.

Their report has been submitted to the Council who have considered it and adopted it unanimously. I now forward it to you on behalf of the Council.

Yours faithfully,
C. R. LOWE
Chairman,
on behalf of the Council.

8th October, 1982.

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Report by Committee II of the Industrial Injuries Advisory Council on Asbestos-Related Diseases without Asbestosis

To the Chairman,

The Industrial Injuries Advisory Council.

Sir,

INTRODUCTION

Background to the enquiry

1. Certain harmful effects of exposure to asbestos dust have long been recognised. Of these, asbestosis and diffuse mesothelioma are already prescribed diseases under the industrial injuries scheme and, as such, give entitlement to benefits in respect of disablement or death. Lung cancer in asbestos workers is not prescribed but, when accompanied by asbestosis, it is accepted as a sequela of the latter condition and attracts benefit accordingly. There is, however, no industrial injuries provision for people who, having worked with asbestos, develop pleural or pulmonary conditions unless they are also entitled to industrial injuries benefit for asbestosis or mesothelioma.

2. On 10th July 1980 Dr. P. C. Elmes, then Director of the Medical Research Council's Pneumoconiosis Unit, wrote to the Minister for Social Security suggesting that industrial injuries cover should be extended to two particular conditions which had been observed to occur in asbestos workers not suffering from asbestosis—lung cancer and diffuse pleural thickening. In fact, the Department of Health and Social Security and the Industrial Injuries Advisory Council's Secretariat have kept a close watch on research into asbestos-related pleural abnormalities, including pleural thickening, for a number of years and, in the light of recent reports, the Council had already agreed that the possibility of prescribing diffuse pleural thickening should be investigated. Additionally, a review of current research literature on lung cancer in asbestos workers confirmed that a reasonable amount of evidence on this subject was now available. Accordingly, in replying to Dr. Elmes on 10th October 1980, the Minister said "the Industrial Injuries Advisory Council is intending to examine the question of the disabling effects of diffuse pleural thickening. Further, I understand that, since there is now a fairly substantial body of evidence available on the relationship between asbestos exposure and lung cancer, this will shortly be drawn to the Council's attention". This correspondence was duly placed before the Council, and its Diseases Sub-Committee (whose work in respect of respiratory diseases has now been taken over by this committee) began an investigation of the two conditions in question.

Method of enquiry

3. As well as considering recently published evidence, we invited written evidence from a number of organisations and individuals with a known interest in the subject. We also asked some of them to supplement their written evidence with oral evidence. A list of those who helped in this way is given in the Appendix. We should like to thank them all, and in particular Dr. Mark Britton and

Professor Margaret Turner-Warwick, for the time and trouble they took to give us information we needed. Our thanks are also due to officials of the Department of Health and Social Security, our Research Librarian Dr. Rose Burley, our Secretary Lynda Lockyer and her assistants Adrian Mummery and, successively, Jane Coker and Rory O'Kelly.

The Report

4. Our report is divided into two parts; the first concerns asbestos-related pleural changes and the second lung cancer in asbestos-exposed workers. Each part discusses the evidence we received, under various headings, and goes on to give our conclusions regarding prescription.

PART I

ASBESTOS-RELATED PLEURAL CHANGES

Background

5. Asbestosis is prescribed for industrial injuries purposes under the general heading of "pneumoconiosis", defined in Schedule 20 to the Social Security Act 1975 as "fibrosis of the lungs due to silica dust, asbestos dust or other dust...". This definition is legally binding on the pneumoconiosis medical boards and means that they cannot make a diagnosis of asbestosis without being satisfied that fibrosis due to asbestos dust has occurred in the claimant's lung tissue. Evidence of fibrotic changes in the pleura, the thin membrane covering the surface of the lung and lining the chest wall, is not relevant to this consideration as a disease affecting only the pleura (which, anatomically and developmentally speaking, is separate from the lung) does not come within the existing statutory definition of pneumoconiosis.

6. The question of industrial injuries compensation for pleural changes unaccompanied by asbestosis has been considered by the Council in the past. In paragraph 48 of its report "Pneumoconiosis and Byssinosis" published (as Command Paper No. 5443) in 1973, the Council described the situation thus:—

> "Studies of dockyard workers exposed to asbestos have shown the prevalence of pleural abnormalities to be 28 per cent in men continuously exposed and only 1·9 per cent in men with little exposure. As regards the effect of such abnormalities, there is evidence that disablement may arise in some instances, but such cases are rare and in general disablement is not associated with pleural changes on their own. While therefore the link with occupation can be accepted, it must be concluded that disablement is not likely to be due to this cause alone. Nevertheless we feel it is important that the definition of pneumoconiosis should cover these pleural abnormalities provided they can be reasonably ascribed to exposure to asbestos dust."

The Council went on to say (in paragraph 59):—

> "We recommend that all pleural abnormalities which can be attributed to occupation should be covered and we feel the simplest way of doing this would be by a statutory provision which made it clear that both the visceral and the parietal pleurae were to be included in the term 'lung'."

7. This recommendation has never been implemented. The reason for this, we were told by the Department of Health and Social Security, is that, because pleural changes are a form of fibrosis, the inclusion of the pleurae in a statutory definition of "the lungs" would compel pneumoconiosis medical boards to diagnose pneumoconiosis in every case where such changes were held to be attributable to occupational asbestos exposure. This, in itself, would be of relatively little consequence were it not for the existence of section 78(3) of the Social Security Act 1975. This provides that "a person suffering from pneumoconiosis shall be treated ... as suffering from a loss of faculty such that the assessed extent of the resulting disablement amounts to not less than 1 per cent". This provision, which came into being after the Council's recommendation was published, would have the effect of making benefit payable in every case, even though the pleural changes in question gave rise to no disablement. Moreover,

in line with existing provisions for pneumoconiosis claimants, the minimum benefit payable in such cases would be a pension at the 10 per cent rate. We have no reason to believe that this was the Council's intention in making its recommendation and, in the circumstances, think it would be inappropriate to consider asbestos-related pleural changes as a form of asbestosis (pneumoconiosis). Accordingly, we have directed our present considerations to the question whether such changes should be prescribed as an industrial disease in their own right.

8. The association between exposure to asbestos dust and the development of pleural abnormalities is well documented. The main abnormalities may be classified as follows (we exclude mesothelioma which is already prescribed):—

(a) *pleural plaques* are well-defined areas of fibrous or calcified thickening occurring most often in the lower parts of the chest wall and on the dome of the diaphragm. They seldom occur in the visceral pleura (that part of the pleura covering the lung) and, indeed, are generally referred to as "parietal pleural plaques" (the parietal pleura being the part lining the chest cavity). They are more readily detected post-mortem than in life, although radiographic detection is made easier if the plaques have become calcified, as often happens. Their occurrence is not specific to people with a history of occupational exposure to asbestos although, when found bilaterally, they are commonly recognised as a useful indicator of such exposure.

(b) *pleural effusions* (the presence of fluid in the pleural cavity) are claimed to be caused, in some instances, by asbestos exposure. However, effusions so caused present no special diagnostic features and their aetiology may be surmised only after the exclusion of other possible causes. Their progress varies considerably between individuals, but some case reports suggest that, as the fluid is absorbed, patients may develop progressive pleural thickening.

(c) *diffuse pleural thickening* is a widespread thickening of the pleura which on postero-anterior chest radiograph is seen as a linear shadow following the lateral chest wall and is often most marked over the lower zones; it can sometimes produce a general "veiling" of the lung which may obscure underlying early asbestosis. Recent surveys of chest radiographs of asbestos workers have shown that diffuse pleural thickening is sometimes observed in the absence of asbestosis.

9. It is now generally accepted that there is a link between these pleural abnormalities and work involving asbestos exposure. Pleural plaques, in the absence of other abnormalities, rarely if ever cause lung function defects and are generally regarded as harmless. Pleural effusions may occur on one or both sides. They are usually transient and the interval between effusions varies between months and years. Patients may be disabled during the acute phase, but in some cases X-ray changes occurring over a period of time may be the only indication of recurrent pleurisy. In the end diffuse pleural thickening may result, but there is uncertainty about the extent to which this form of abnormality, on its own, may give rise to disablement. Most studies published since 1973, some of which have suggested a connection between asbestos-induced pleural thickening and a reduced vital capacity (the amount of air expelled from

the lungs after taking a deep breath), have had at be regarded as largely inconclusive in this respect. However, recent publications appear to offer more positive information and have persuaded the Department and the Council that there is now sufficient evidence to justify a close look at the case for prescribing one particular form of this disease, namely bilateral diffuse pleural thickening. The great majority of the evidence we considered suggested that unilateral thickening does not give rise to any disablement.

Statutory requirements for the prescription of occupational diseases

10. The circumstances in which a disease may be prescribed in relation to any employed earners are set out in section 76(2) of the Social Security Act 1975. This provides that the Secretary of State must first be satisfied that the disease:—

(a) ought to be treated, having regard to its causes and incidence and any other relevant considerations, as a risk of their occupations and not as a risk common to all persons; and

(b) is such that, in the absence of special circumstances, the attribution of particular cases to the nature of the employment can be established or presumed with reasonable certainty.

The questions to be answered

11. As we were already satisfied that bilateral diffuse pleural thickening was the only disabling form of pleural change, the principal aim of our enquiries was to ascertain whether it might be held to meet those requirements. When considering the evidence before us, therefore, we found it necessary to bear in mind the following questions:—

(i) Can bilateral diffuse pleural thickening in asbestos workers be caused by anything other than asbestos?

(ii) Can the condition be diagnosed satisfactorily?

(iii) Does the condition give rise to assessable disablement?

(iv) What is the incidence of the condition in asbestos workers with no detectable asbestosis?

Causation

12. We were told that bilateral diffuse pleural thickening without a history of exposure to asbestos is rare. It may occur, for example, in rheumatoid arthritis or scleroderma, but these conditions are usually obvious clinically.

Diagnosis

13. Bilateral pleural thickening sufficient to cause disability is associated with restriction of respiratory movement of the chest wall and diaphragm. The evidence we considered was not unanimous on the question of how much thickening had to be present before a satisfactory diagnosis could be made. We think it reasonable to accept, however, that the diagnosis can be confirmed by postero-anterior and right and left oblique view chest radiographs showing bilateral diffuse pleural thickening of at least extent "2" and width "b" in the International Classification of Radiographs of Pneumoconioses (International

Labour Office—Occupational Safety and Health Series No. 22—revised 1980)*. As to other methods of diagnosis in life, we feel it is appropriate to apply to asbestos-related pleural disease the view expressed by the Council in 1973 when it said, in relation to the diagnosis of asbestosis itself:—

> "Although it may be in limited use for this purpose, we are strongly of the opinion that no form of lung biopsy can . . . be justified for the purpose of diagnosing . . . solely to determine claims for compensation." (Cmnd. 5443—paragraph 45.)

14. Because the lung is firmly adherent to the pleura, post-mortem diagnosis is best made on the thoracic organs removed complete with pleurae after extrapleural dissection. The extent of the thickening should correspond to the ILO definition given above. As the pathological changes are non-specific, the diagnosis in every case should be supported by an appropriate occupational history of exposure to asbestos and the absence of evidence of other possible causes of pleural thickening.

Disablement

15. Under the provisions of the Social Security Act 1975, disablement benefit is payable if, as the result of an industrial accident or prescribed disease, an employed earner suffers from "loss of physical or mental faculty such that the assessed extent of the resulting disablement amounts to not less than 1 per cent."

16. The terms "loss of faculty", "disability" and "disablement" are not defined in the Act, but the House of Lords has interpreted "loss of faculty" as impairment of the proper functioning of part of the body or mind, "disability" as partial or total failure of power to perform normal bodily or mental processes, and "disablement" as the sum of disabilities which, when compared with the powers of a normal person, can be expressed as a percentage—see Reg. v Nat. Ins. Cmr. Ex parte Hudson [1972] 2 WLR 210 at page 265.

17. In considering whether to recommend the prescription of asbestos-related pleural thickening, we attached particular importance to evidence suggesting that the condition can give rise to a loss of faculty leading to assessable disablement. Published research results, together with the oral and written evidence we received, confirm that bilateral diffuse pleural thickening can occur in the absence of detectable fibrosis of the lung and can, by restricting the lung's ability to expand, produce changes in objectively measured lung function. In some cases the individual concerned may experience breathlessness and sometimes tightness and pain in the chest, or a combination of these symptoms.

18. In the light of the evidence, we accept that bilateral diffuse pleural thickening can be associated with chest discomfort and impairment of respiratory function. We are also prepared to accept, having heard several witnesses' views

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**Pleural thickening*
Extent "2" = total length exceeding one-quarter but not one-half of the projection of the lateral chest wall.
Width "b" = maximum width over about 5mm and up to about 10mm.

on this point, that in life it would be possible to assess the loss of faculty by the normal clinical and laboratory methods employed by the Pneumoconiosis Medical Panels.

Incidence

19. Although the various studies we considered did not enable us to make any firm estimate of the number of cases likely to benefit if the condition were to be prescribed, witnesses were agreed that the number would not be large.

Conclusions and recommendations

20. The evidence we have considered has confirmed that in the absence of overt asbestosis the majority of asbestos-related pleural abnormalities observed on X-ray do not cause any disablement. It is also clear, however, that, again in the absence of evidence of asbestosis, some cases of bilateral diffuse pleural thickening are associated with a demonstrable impairment of respiratory function. We believe that such cases should be covered by the industrial injuries scheme.

21. We have already indicated, in paragraph 13, the minimum extent and width of pleural thickening needed to assist the identification of such cases. It would, we feel, be helpful to all concerned, principally by reducing the scope for misunderstanding, if those dimensions could be incorporated in the terms of prescription. Initially, this would involve describing the condition in question along the following lines:—

> "Bilateral diffuse pleural thickening more than 5mm thick and extending over more than one-quarter of the chest wall."

Whether these particular measurements should continue in use should, we suggest, be decided in the light of experience.

22. As regards the occupations to be covered by prescription, we accept that a causal link may be presumed in the case of people with a history of employment in one of the occupations for which asbestosis and diffuse mesothelioma are prescribed, namely, in "any occupation involving:—

- (a) the working or handling of asbestos or any admixture of asbestos;
- (b) the manufacture or repair of asbestos textiles or other materials containing or composed of asbestos;
- (c) the cleaning of any machinery or plant used in any of the foregoing operations and of any chambers, fixtures and appliances for the collection of asbestos dust;
- (d) substantial exposure to the dust arising from any of the foregoing operations".*

23. Accordingly, we recommend that bilateral diffuse pleural thickening conforming to the description we have suggested in paragraph 21 should be prescribed and should be presumed to be due to the nature of the employment

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*The Social Security (Industrial Injuries) (Prescribed Diseases) Regulations 1980 [S.I. 1980 No. 377] Schedule 1, Part I (para 44) and Part II (para 9).

when any of the above occupations are involved. The measurements specified in the terms of prescription should be open to review. In line with the current provisions relating to pneumoconiosis and diffuse mesothelioma, we also recommend that disablement benefit, and not injury benefit, should be payable in such cases.

PART II

LUNG CANCER IN ASBESTOS WORKERS WITHOUT ASBESTOSIS

Background

24. In his annual report for 1947 the Chief Inspector of Factories drew attention to a higher prevalence of lung cancer among men known to have died from asbestosis than among those who had died from silicosis. Since then epidemiological research has amply confirmed that asbestos workers with asbestosis suffer from a greatly increased risk of developing lung cancer. As a result, although lung cancer in asbestos workers is not prescribed, when accompanied by asbestosis it is accepted by pneumoconiosis medical boards as a sequela of the asbestosis and this permits appropriate industrial injuries benefits to be paid.

25. In a letter to the Minister for Social Security (see paragraph 2) Dr. Elmes said that the lung cancer risk in asbestos workers is related to amount and duration of asbestos exposure rather than to the presence or absence of asbestosis and suggested that the industrial injuries provisions should be extended to enable benefit to be paid to cases where lung cancer develops in asbestos workers but is unaccompanied by asbestosis. Subsequently the Council's Diseases Sub-Committee began an investigation of this problem which, following a reorganisation of the Council's two committees, we have now completed.

Questions to be considered

26. Early in our deliberations we decided that our investigation must focus on answering the following three questions:—

(i) Is it accepted that there is an association between asbestos exposure and lung cancer in the absence of any evidence of asbestosis?

(ii) If so, could the attribution of particular cases to the nature of the employment be established or presumed with reasonable certainty?

(iii) If so, could prescription be limited to cover such cases?

Lung cancer in the absence of asbestosis

27. So far as we can ascertain, there has been no epidemiological study designed specifically to investigate the possibility of an association between asbestos exposure and lung cancer in the absence of overt asbestosis. Nevertheless, we believe on the following grounds that such an association is likely to exist. First, research has shown that the incidence of lung cancer deaths among asbestos workers is directly related to total asbestos dust exposure. Second, workers awarded industrial disablement benefit for asbestosis at the lowest level already have an increased mortality from lung cancer when compared with appropriate controls. When these two points are taken together, it is reasonable to conclude that asbestos-exposed workers who have not yet developed asbestosis may nevertheless have an increased risk of lung cancer.

Lung cancer and smoking

28. Lung cancer is now the commonest cancer among men and cigarette smoking is known to be a major cause. It is also generally accepted that tobacco smoking and inhaling asbestos dust can act together in initiating the cancer. In fact their effects appear to be multiplicative rather than additive. The Council recognised this in its 1973 report "Pneumoconiosis and Byssinosis" (Cmnd. 5443) when it said in paragraph 49:—

> "A recent study of the smoking habits and mortality of a group of asbestos workers in London has confirmed the findings of earlier investigations that asbestos workers who smoke incur a much greater risk of death from bronchial carcinoma than those who do not smoke; the effect of smoking and exposure to asbestos together is multiplicative rather than additive. We cannot emphasise too strongly the serious risk run by any worker exposed to asbestos dust who habitually smokes cigarettes; by this habit his future health is placed in jeopardy and his expectation of life is reduced."

29. The evidence of this interaction between asbestos dust and smoking is even stronger today, and witnesses left us in no doubt that the great majority of lung cancers in asbestos workers are due to the combined effect of both these carcinogens. A study of mortality among insulation workers in the United States* has produced the following estimates of the relative risks of smoking and asbestos exposure:—

Non-exposed non-smoking controls	1·0
Asbestos-exposed non-smokers	5·2
Non-exposed smokers	10·9
Asbestos-exposed smokers	53·2

These figures, when applied generally, show that for non-smokers exposed to asbestos the risk of lung cancer is some 5 times greater than the risk faced by non-smokers with no asbestos exposure. Interestingly, the risk for smokers who are exposed to asbestos is also about 5 times greater than for non-exposed smokers. People suffering from asbestosis, of course, may come within either category of asbestos-exposed workers.

Prescription of lung cancer in the absence of asbestosis

30. The statutory requirements for prescription are set out in full in paragraph 10 of this report. The problem to be faced, if lung cancer among asbestos workers is to be prescribed in the absence of asbestosis, is that in particular cases its connection with employment must be capable of being "established or presumed with reasonable certainty". In an asbestos worker with lung cancer who is a smoker there is no way in which the relative contributions of smoking and asbestos exposure to causing the disease can be assessed, except to say that smoking and asbestos together are likely to have played a more important part than asbestos exposure alone would have done. In the case of an asbestos-exposed non-smoker there would, theoretically, be no problem; the lung cancer could be presumed with reasonable certainty to be

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*Hammond, E. C., Selikoff, I. J. and Seidman, H. Asbestos exposure, cigarette smoking and death rates. *Annals of the New York Academy of Sciences* 1979, Vol. 330, pp 473–490.

due to the nature of the employment. In practice, however, any attempt to prescribe lung cancer for non-smokers but not for smokers would be fraught with difficulty.

31. In the circumstances, we feel that, for prescription purposes, it would be reasonable to disregard smoking habits altogether and rely simply on the premise that, where there is occupational exposure to asbestos, the risk of lung cancer developing is directly related to the amount of that exposure, or total "dose". But this calls for some method of assessing the dose involved. One method might be to impose a limit of a given number of years of asbestos exposure after which cancer would be accepted as being due to the exposure whether or not asbestosis is present, but restraints of this type are arbitrary and have little scientific validity. Some other "marker" of asbestos dose would thus be preferable.

32. In this connection our attention has been drawn to research findings suggesting that visible pleural plaques may be regarded as an indicator of sufficient asbestos exposure to produce an increased risk of lung cancer. Additionally, our own findings in relation to asbestos-related pleural disease lead us to believe that the presence of bilateral diffuse pleural thickening would be acceptable as another such indicator. On this basis, we believe that prescription would be feasible if it were expressed in the terms suggested in paragraph 35 below.

Conclusions and recommendations

33. We are clear from the evidence we have received that occupational exposure to asbestos may cause lung cancer in the absence of overt asbestosis. The evidence provides no information about the frequency with which this may happen, except that it is likely to be low. We are also clear that, although among such cases tobacco smoking is likely to be a more important causal factor than the asbestos exposure, the risk of workers developing lung cancer is dose-related, regardless of smoking habits.

34. We therefore recommend that cancer of the lung should be prescribed for asbestos workers and should be presumed to be due to the nature of the employment when any of the occupations listed in paragraph 22 are involved. We believe, however, that coverage should be limited to those cases exhibiting the asbestos dose indicators we have mentioned in paragraph 32.

35. Accordingly, we suggest the terms of prescription should be on the following lines:—

> "Primary carcinoma of the lung where there is accompanying evidence of one or more of the following:—
>
> (a) asbestosis*;
>
> (b) bilateral diffuse pleural thickening;
>
> (c) bilateral pleural plaques."

The inclusion of asbestosis itself in this list of "markers" would effectively bring into legislation the present practice described in paragraph 24 above.

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*For definition, see paragraph 5.

36. In conclusion, we feel we must take this opportunity to stress, once again, the very real and serious health risk run by asbestos workers who continue to smoke.

(Signed) C. R. LOWE (*Chairman*)
P. LESLEY BIDSTRUP
D. W. BOYDELL
PETER ELMES
J. Ll. McQUITTY
TREVOR MAWER
MURIEL NEWHOUSE
PETER W. REYNOLDS

LYNDA LOCKYER (*Secretary*)
R. O'KELLY (*Assistant Secretary*)
11th June 1982

APPENDIX

List of Organisations and Individuals from whom evidence was received

Written and oral evidence was supplied by the following:—

Dr. Mark Britton
Professor J. Corbett McDonald
Dr. P. C. Elmes
Mrs. Nancy Tait, Society for the Prevention of Asbestosis and Industrial Diseases
Professor Margaret Turner-Warwick
Dr. P. H. Wright

The following presented oral evidence only:—

Dr. W. Raymond Parkes

The following submitted written evidence only:—

Professor E. D. Acheson
The Asbestos Information Centre Ltd
Professor B. Corrin
Dr. Dewi Davies
Department of Health and Social Security
Faculty of Occupational Medicine, Royal College of Physicians
Dr. J. Gilson
Dr. A. Herbert
Dr. J. S. P. Jones
Dr. M. McCoubrie
Messrs. Mason, Baggott and Garton, Solicitors
Dr. Anthony Seaton
Dr. W. J. Smither
Dr. R. M. Whittington, H. M. Coroner for the District of Birmingham.